

9-5-00

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jc921 U.S. PTO  
09/01/00

CUSTOMER NO. 005179

jc639 U.S. PTO  
09/654382  
09/01/00

PATENT

Preliminary classification:  
Proposed Class:  
Subclass:

NOTE: All applicants are requested to include a preliminary classification on newly filed patent applications. The preliminary classification, preferable class and subclass designations, should be identified in the upper right-hand corner of the letter of transmittal accompanying the application papers, for example >Proposed Class 2, subclass 129, M.P.E.P. § 601, 7<sup>th</sup> ed.

Box: Patent Application  
Commissioner for Patents  
Washington, D.C. 20231

Practitioner  
Docket No. 30882UT1001

## NEW APPLICATION TRANSMITTAL

Transmitted herewith for filing is the patent application of  
Inventor(s):

WAYNE HARLAN

## WARNING:

37 CFR 1.41(a) (1) points out:

"(a) A patent is applied for in the name or names of the actual inventor or inventors.

"(1) The inventorship of a nonprovisional application is that inventorship set forth in the oath or declaration as prescribed by § 1.63, except as provided for in § 1.53(d)(4) and § 1.63(d). If an oath or declaration as prescribed by § 1.63 is not filed during the pendency of a nonprovisional application, the inventorship is that inventorship set forth in the application papers filed pursuant to § 1.53(b) unless a petition under this paragraph accompanied by the fee set forth in § 1.17(l) is filed supplying or changing the name or names of the inventor or inventors."

For (title):

POLYMER-MODIFIED ASPHALT EMULSION

CERTIFICATION UNDER 37 CFR 1.10\*  
(Express Mail label number is **mandatory**.)  
(Express Mail certification is optional.)

I hereby certify that this New Application Transmittal and the documents referred to as enclosed therein are being deposited with the United States Postal Service on this date, **September 1, 2000**, in an envelope as "Express Mail Post Office to Addressee" Mailing Label No. **EL548785156US** addressed to the: **Box: PATENT APPLICATIONS**, Commissioner for Patents, Washington, D.C. 20231.

Annette M. Turk, Legal Assistant

*Annette M. Turk*  
(Signature of person mailing paper)



005179

PATENT TRADEMARK OFFICE

NOTE: Certificate of mailing (first class) or facsimile transmission procedures of 37 CFR 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.

NOTE: Each paper or fee referred to as enclosed herein **must** have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 CFR 1.10(b).

"Since the filing of correspondence under § 1.10 without the Express Mail Mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will **not** be granted on petition," Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439 at 56,442.

## 1. Type of Application

This new application is for a(n) (check one applicable item below):

- ☒ Original (Nonprovisional)  
☐ Design  
☐ Plant

**WARNING:** Do not use this transmittal for a completion in the U.S. of an International Application under 35 U.S.C. 371(c)(4) unless the international Application is being filed as a divisional, continuation or continuation-in-part application.

**WARNING:** Do not use this transmittal for the filing of a provisional application.

NOTE: If one of the following 3 items apply then complete and attach **ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF A PRIOR U.S. APPLICATION IS CLAIMED** and a **NOTIFICATION IN PARENT APPLICATION OF THE FILING OF THIS CONTINUATION APPLICATION**

- ☐ Divisional  
☐ Continuation  
☐ Continuation-in-part (C-I-P)

## 2. Benefit of Prior U.S. Application(s) (35 USC 119(e), 120 or 121)

Note: A nonprovisional application may claim an invention disclosed in one or more prior filed copending nonprovisional applications or copending international applications designating the United States of America. In order for a nonprovisional application to claim the benefit of a prior filed copending nonprovisional application or copending international application designating the United States of America, each prior application must name as an inventor at least one inventor named in the later filed nonprovisional application and disclose the named inventor's invention claimed in at least one claim of the later filed nonprovisional application in the manner provided by the first paragraph of 35 U.S.C. 112. Each prior application must also be:

- (i) An international application entitled to a filing date in accordance with PCT Article 11 and designating the United States of America; or
  - (ii) Complete as set forth in § 1.51(b); or
  - (iii) Entitled to a filing date as set forth in § 1.53(b) or § 1.53(d) and include the basic filing fee set forth in § 1.16; or
  - (iv) entitled to a filing date as set forth in § 1.53(b) and have paid therein the processing and retention fee set forth in § 1.21(l) within the same period set forth in § 1.53(f).
- 37 C.F.R. § 1.78(a)(1).

NOTE: If the new application being transmitted is a divisional, continuation or a continuation-in-part of a parent case, or where the parent case is an International Application which designated the U.S., or benefit of a prior provisional application is claimed, then check the following item and complete and attach **ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED**.

**WARNING:** If an application claims the benefit of the filing date of an earlier filed application under 35 USC 120, 121 or 365(c), the 20-year term of that application will be based upon the filing date of the earliest U.S. application that the application makes reference to under 35 USC 120, 121 or 365(c), (35 USC 154(a)(2) does not take into account, for the determination of the patent term, any application to which priority is claimed under 35 USC 119, 365(a) or 365(b).) For a C-I-P application, applicant should review whether any claim in the patent that will issue is supported by an earlier application and, if not, the applicant should consider canceling the reference to the earlier filed application. The term of a patent is not based on a claim-by-claim approach. See Notice of April 14, 1995, 60 Fed. Reg. 20,195, at 20,205

WARNING: When the last day of pendency of a provisional application falls on a Saturday, Sunday, or Federal holiday within the District of Columbia, any nonprovisional application claiming benefit of the provisional application must be filed prior to the Saturday, Sunday, or Federal holiday within the District of Columbia. See 37 C.F.R. § 1.78(a)(3)

X The new application being transmitted claims the benefit of prior U.S. application(s) and enclosed are ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

### 3. Papers Enclosed

#### A. Required For Filing Date Under 37 CFR 1.53(b) (Regular) or 37 CFR 1.153 (Design) Application

14 Pages of specification  
5 Pages of claims  
3 Sheets of Drawing

WARNING: DO NOT submit original drawings. A high quality copy of the drawings should be supplied when filing a patent application. The drawings that are submitted to the Office must be on strong, white, smooth, and non-shiny paper and meet the standards according to § 1.84. If corrections to the drawings are necessary, they should be made to the original drawing and a high-quality copy of the corrected original drawing then submitted to the Office. Only one copy is required or desired. For comments on proposed new 37 CFR 1.84. Notice of March 9, 1988 (1990 O.G. 57-62).

NOTE: "Identifying indicia, if provided, should include the application number or title of the invention, inventor's name, docket number, and the name and phone number of a person to call if the Office is unable to match the drawings to the proper application. This information should be placed on the back of each sheet of drawing a minimum distance of 1.5 cm. (5/8") down from the top of the page." 37 CFR 1.84(c).

(complete the following, if applicable)

     The enclosed drawing(s) are photograph(s), and there is also attached a "PETITION TO ACCEPT PHOTOGRAPH(S) AS DRAWINGS(S)". 37 CFR 1.84(b).

     formal  
X informal

#### B. Other Papers Enclosed

10 Pages of declaration and power  
1 Pages of Abstract  
     Other

### 4. Additional papers enclosed

     Amendment to claims  
     Cancel in this application claims      before calculating the filing fee.  
(at least one original independent claim must be retained for filing purposes.)  
     Add the claims shown on the attached amendment. (claims added have been numbered consecutively following the highest numbered original claim.)

     Preliminary Amendment  
     Information Disclosure Statement (37 CFR 1.98)  
     Form PTO-1449 (PTO/SB/08A and 08/B)  
     Citations  
     Declaration of Biological Deposit  
     Submission of "Sequence Listing," computer readable copy and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequence.  
     Authorization of Attorney(s) to Accept and Follow Instructions from Representative  
     Special Comments  
X Other X Associate Power of Attorney  
     Petition to Make Special

## 5. Declaration or oath (including power of attorney)

**NOTE:** A newly executed declaration is not required in a continuation or divisional application provided that the prior nonprovisional application contained a declaration as required, the application being filed is by all or fewer than all the inventors named in the prior application, there is no new matter in the application being filed, and a copy of the executed declaration filed in the prior application (showing the signature or an indication thereon that it was signed) is submitted. The copy must be accompanied by a statement requesting deletion of the names of person(s) who are not inventors of the application being filed. If the declaration in the prior application was filed under § 1.47, then a copy of that declaration must be filed accompanied by a copy of the decision granting § 1.47 status or, if a nonsigning person under § 1.47 has subsequently joined in a prior application, then a copy of the subsequently executed declaration must be filed. See 37 C.F.R. § 1.63(d)(1)-(3).

**Note:** A declaration filed to complete an application must be executed, identify the specification to which it is directed, identify each inventor by full name including family name and at least one given name, without abbreviation together with any other given name or initial, and the residence, post office address and country or citizenship of each inventor, and state whether the inventor is a sole or joint inventor. 37 C.F.R. § 1.63(a)(1)-(4).

**Note:** "The inventorship of a nonprovisional application is that inventorship set forth in the oath or declaration as prescribed by § 1.62, except as provided in § 1.53(d)(4) and § 1.63(d). If an oath or declaration as prescribed by § 1.63 is not filed during the pendency of a nonprovisional application, the inventorship is that inventorship set forth in the application papers filed pursuant to § 1.53(b), unless a petition under this paragraph accompanied by the fee set forth in § 1.17(i) is filed supplying or changing the name or names of the inventor or inventors." 37 C.F.R. § 1.41(a)(1).

### ☒ Enclosed **UNSIGNED**

executed by (check **all** applicable boxes)

☒ inventor(s).

☐ legal representative of inventor(s) 37 CFR 1.42 or 1.43

☐ joint inventor or person showing a proprietary interest on behalf of inventor who refused to sign or cannot be reached

☐ This is the petition required by 37 CFR 1.47 and the statement required by 37 CFR 1.47 is also attached. See item 13 below for fee.

☐ Not enclosed

**WARNING:** Where the filing is a completion in the U.S. of an International Application but where a declaration is not available or where the completion of the U.S. application contains subject matter in addition to the International Application the application may be treated as a continuation or continuation-in-part, as the case may be, utilizing ADDED PAGE FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION CLAIMED.

☐ Application is made by a person authorized under 37 CFR 1.41(c) on behalf of all the above named inventor(s).

(The declaration or oath, along with the surcharge required by 37 CFR 1.16(e) can be filed subsequently.)

☐ Showing that the filing is authorized. (Not required unless called into question. 37 CFR 1.41(d).

## 6. Inventorship Statement

**NOTE:** If the named inventors are each not the inventors of all the claims an explanation, including the ownership of the various claims at the time the last claimed invention was made, should be submitted.

The inventorship for all the claims in this application are:

☒ The same

or

☐ Are not the same. An explanation, including the ownership of the various claims at the time the last claimed invention was made,

☐ is submitted

☐ will be submitted.

## 7. Language

NOTE: An application including a signed oath or declaration may be filed in a language other than English. A verified English translation of the non-English language application and the processing fee of \$130.00 required by 37 CFR 1.17(k) is required to be filed with the application or within such time as may be set by the Office. 37 CFR 1.52(d).

NOTE: A non-English oath or declaration in the form provided or approved by the PTO need not be translated. 37 CFR 1.69(b).

☒ English

☐ non-English

☐ the attached translation includes a statement that the translation is accurate. 37 CFR 1.52(d).

## 8. Assignment

☒ An assignment of the invention to JSG Enterprises, Inc.

☐ is attached. A separate ☐ "COVER SHEET FOR ASSIGNMENT DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.

☒ will follow.

NOTE: "If an assignment is submitted with a new application, send two separate letters -- one for the application and one for the assignment." Notice of May 4, 1990 (1114 O.G. 77-78).

WARNING: A newly executed "CERTIFICATE UNDER 37 CFR 3.73(b)" must be filed when a continuation-in-part application is filed by an assignee. Notice of April 30, 1993, 1150 O.G. 62-64.

## 9. Certified Copy

Certified copy(ies) of application(s)

(country)	(appln.no.)	(filed)
(country)	(appln.no.)	(filed)
(country)	(appln.no.)	(filed)

from which priority is claimed.

☐ is (are) attached.

☐ will follow.

NOTE: The foreign application forming the basis for the claim for priority **must** be referred to in the **oath or declaration**. 37 CFR 1.55(a) and 1.63.

NOTE: This item is for any foreign priority for which the application being filed directly relates. If any parent U.S. application or International Application from which this application claims benefit under 35 U.S.C. 120 is itself entitled to priority from a prior foreign application then complete item 18 on the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

## 10. Fee Calculation (37 CFR 1.16)

A. ☒ Regular application

CLAIMS AS FILED					
Number Filed		Number Extra	Rate	Basic Fee 37 CFR 1.16(a) \$690.00	
Total Claims 37 CFR 1.16(c)	44 - 20 =	24	X	\$18.00	432.00
Independent Claims 37 CFR 1.16(b)	3 - 3 =	--	X	\$78.00	
Multiple dependent claim(s), if any 37 CFR 1.16(d)			X	\$260.	0.00

☐ Amendment canceling extra claims enclosed.

- ☐ Amendment deleting multiple-dependencies enclosed.  
☐ Fee for extra claims is not being paid at this time.

NOTE: If the fees for extra claims are not paid on filing they must be paid or the claims canceled by amendment prior to the expiration of the time period set for response by the Patent and Trademark Office in any notice of fee deficiency. 37 CFR 1.16(d).

Filing Fee Calculation \$ 1122.00

- B. ☐ **Design Application**  
 (\$310.00 -- 37 CFR 1.16(f)) \$ **310.00**  
 C. ☐ **Plant Application**  
 (\$480.00 -- 37 CFR 1.16(g)) \$ **480.00**

Filing Fee Calculation \$         

# 11. Small Entity Statement(s)

- ☒ Statement(s) that this is a filing by a small entity under 37 CFR 1.9 and 1.27 is (are) attached

WARNING: "Status as a small entity must be specifically established in each application or patent in which the status is available and desired. Status as a small entity in one application or patent does not affect any other application or patent, including applications or patents which are directly or indirectly dependent upon the application or patent in which the status has been established. The refiling of an application under § 1.53 as a continuation, division, or continuation-in-part (including a continued prosecution application under § 1.53(d), or the filing of a reissue application requires a new determination as to continued entitlement to small entity status for the continuing or reissue application. A nonprovisional application claiming benefit under 35 USC 119(e), 120, 121 or 365(c) of a prior application or a reissue application may rely on a statement filed in the prior application or in the patent if the nonprovisional application or the reissue application includes a reference to a statement in the prior application or in the patent or includes a copy of the statement in the prior application or in the patent and status as a small entity is still proper and desired. The payment of the small entity basic statutory filing fee will be treated as such a reference for purposes of this section" 37 CFR § 1.28(a).

"Small entity status must not be established with the person or persons signing the...statement can unequivocally make the required self-certification." M.P.E.P. § 509.03, 6<sup>th</sup> ed., rev. 2, July 1996 (emphasis added).

(complete the following, if applicable)

- ☒ Status as a small entity was claimed in prior application U.S. Serial No. 60/152,399 filed on September 3, 1999 from which benefit is being claimed for this application under:

35 USC ☒ 119(e)  
☐ 120  
☐ 121  
☐ 365(c),

and which status as a small entity is still proper and desired.

- ☒ A copy of the Statement in the prior application is included.

Filing Fee Calculation (50% of A, B, or C above) \$ 561.00

NOTE: Any excess of the full fee paid will be refunded if a statement and a refund request are filed within two months of the date of timely payment of a full fee. 37 CFR 1.28(a). The two-month period is not extendable under § 1.136. 37 CFR 1.28(a)

# 12. Request for International-Type Search (37 CFR 1.104(d)) (complete if applicable)

- ☐ Please prepare an international-type search report for this application at the time when national examination on the merits takes place.

**13. Fee Payment Being Made At This Time**

☐ Not Enclosed

☐ No filing fee is to be paid at this time. (*This and the surcharge required by 37 CFR 1.16(e) can be paid subsequently.*)

☒ Enclosed

☒ basic filing fee \$ 561.00

☐ recording assignment (\$40.00; 37 CFR 1.21(h)) \$ \_\_\_\_\_  
[see attached COVER SHEET FOR ASSIGNMENT  
ACCOMPANYING NEW APPLICATION]

☐ petition fee for filing by other than all the inventors  
or person on behalf of the inventor where inventor  
refused to sign or cannot be reached (\$130.00; 37  
CFR 1.47 and 1.17(i)) \$ \_\_\_\_\_

☐ for processing an application with a specification in  
a non-English language (\$130.00; 37 CFR 1.52(d)  
and 1.17(k)) \$ \_\_\_\_\_

☐ processing and retention fee  
(\$130.00; 37 CFR 1.52(d) and 1.21(l)) \$ \_\_\_\_\_

☐ fee for international-type search report \$40.00; 37  
CFR 1.21(e)) \$ \_\_\_\_\_

NOTE: 37 CFR 1.21(l) establishes a fee for processing and retaining any application which is abandoned for failing to complete the application pursuant to 37 CFR 1.53(f) and this, as well as the changes to 37 CFR 1.53 and 1.78 (a)(1), indicate that in order to obtain the benefit of a prior U.S. application, either the basic filing fee must be paid or the processing and retention fee of § 1.21(l) must be paid within 1 year from notification under § 53(f).

**Total fees enclosed** \$ 561.00

**14. Method of Payment of Fees**

☒ Check(s) in the amount of \$ 561.00

☐ Charge Account No. 13-4213 in the amount of \$ \_\_\_\_\_. A duplicate of this transmittal is attached.

NOTE: Fees should be itemized in such a manner that it is clear for which purpose the fees are paid. 37 CFR 1.22(b).

## 15. Authorization to Charge Additional Fees

**WARNING:** If no fees are to be paid on filing the following items should **not** be completed.

**WARNING:** Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges, if extra claim charges are authorized.

X The Commissioner is hereby authorized to charge the following additional fees by this paper and during the entire pendency of this application to Account No. 13-4213:

X 37 CFR 1.16(a), (f) or (g) (filing fees)

X 37 CFR 1.16(b), (c) and (d) (presentation of extra claims)

**NOTE:** Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims canceled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 CFR 1.16(d)), it might be best not to authorize the PTO to charge additional claim fees, except possibly when dealing with amendments after final action.

X 37 CFR 1.16(e) (surcharge for filing the basic filing fee and/or declaration on a date later than the filing date of the application)

X 37 CFR 1.17(a)(1)-(5) (application processing fees)

**NOTE:** "...A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 C.F.R. § 1.136(a)(3).

     37 CFR 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 CFR 1.311(b)).

**NOTE:** Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 CFR 1.311(b).

**NOTE:** 37 CFR 1.28(b) requires "Notification of any change in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying . . . issue fee." From the wording of 37 CFR 1.28(b): (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.

## 16. Instructions As To Overpayment

**Note:** "...amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payor be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 C.F.R. § 1.26(a).

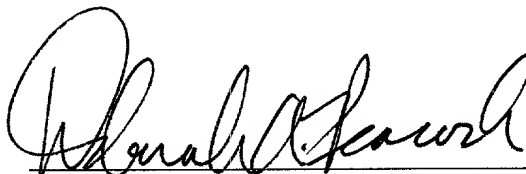
X credit Account No. 13-4213

     refund

Reg. No. 31,649

Tel. No. (505) 998-1500

Customer No. 005179



Deborah A. Peacock,  
PEACOCK, MYERS & ADAMS, P.C.  
P. O. Box 26927  
Albuquerque, New Mexico 87125-6927  
Direct line: (505) 998-1501



Parameter	Unit	Value	Standard Error	t-Statistic	p-Value
Intercept		1.0000	0.0000	1.0000	0.0000
Age	Years	0.0000	0.0000	0.0000	0.0000
Age squared	Years squared	0.0000	0.0000	0.0000	0.0000
Age cubed	Years cubed	0.0000	0.0000	0.0000	0.0000
Age quartic	Years quartic	0.0000	0.0000	0.0000	0.0000
Age quintic	Years quintic	0.0000	0.0000	0.0000	0.0000
Age sextic	Years sextic	0.0000	0.0000	0.0000	0.0000
Age septic	Years septic	0.0000	0.0000	0.0000	0.0000
Age octic	Years octic	0.0000	0.0000	0.0000	0.0000
Age nonic	Years nonic	0.0000	0.0000	0.0000	0.0000
Age decic	Years decic	0.0000	0.0000	0.0000	0.0000
Age undecic	Years undecic	0.0000	0.0000	0.0000	0.0000
Age duodecic	Years duodecic	0.0000	0.0000	0.0000	0.0000
Age tredecic	Years tredecic	0.0000	0.0000	0.0000	0.0000
Age quattuordecic	Years quattuordecic	0.0000	0.0000	0.0000	0.0000
Age quindecic	Years quindecic	0.0000	0.0000	0.0000	0.0000
Age sexdecic	Years sexdecic	0.0000	0.0000	0.0000	0.0000
Age septendecic	Years septendecic	0.0000	0.0000	0.0000	0.0000
Age octodecic	Years octodecic	0.0000	0.0000	0.0000	0.0000
Age novemdecic	Years novemdecic	0.0000	0.0000	0.0000	0.0000
Age vigintic	Years vigintic	0.0000	0.0000	0.0000	0.0000
Age unvigintic	Years unvigintic	0.0000	0.0000	0.0000	0.0000
Age bivigintic	Years bivigintic	0.0000	0.0000	0.0000	0.0000
Age trivigintic	Years trivigintic	0.0000	0.0000	0.0000	0.0000
Age quadravigintic	Years quadravigintic	0.0000	0.0000	0.0000	0.0000
Age quinquavigintic	Years quinquavigintic	0.0000	0.0000	0.0000	0.0000
Age sexavigintic	Years sexavigintic	0.0000	0.0000	0.0000	0.0000
Age septuavigintic	Years septuavigintic	0.0000	0.0000	0.0000	0.0000
Age octuavigintic	Years octuavigintic	0.0000	0.0000	0.0000	0.0000
Age nonuavigintic	Years nonuavigintic	0.0000	0.0000	0.0000	0.0000
Age decuavigintic	Years decuavigintic	0.0000	0.0000	0.0000	0.0000
Age undecuavigintic	Years undecuavigintic	0.0000	0.0000	0.0000	0.0000
Age duodecuavigintic	Years duodecuavigintic	0.0000	0.0000	0.0000	0.0000
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Age viginticuavigintic	Years viginticuavigintic	0.0000	0.0000	0.0000	0.0000
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Age quadraviginticuavigintic	Years quadraviginticuavigintic	0.0000	0.0000	0.0000	0.0000
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  X   Plus Added Pages for New Application Transmittal Where Benefit of Prior U.S. Application(s) Claimed Number of pages added five

Plus added pages deleting names of inventor(s) named in prior application(s) who is/are no longer inventor(s) of the subject matter claimed in this application  
Number of pages added \_\_\_\_\_

**Statement Where No Further Pages Added**

\_\_\_\_\_ This transmittal ends with this page.

ADDED PAGES FOR APPLICATION TRANSMITTAL WHERE BENEFIT OF  
PRIOR U.S. APPLICATION(S) CLAIMED

**NOTE: See 37 CFR 1.78(a).**

## 17. Relate Back

**WARNING:** *If an application claims the benefit of the filing date of an earlier filed application under 35 USC 120, 121 or 365(c), the 20-year term of that application will be based upon the filing date of the earliest U.S. application that the application makes reference to under 35 USC 120, 121 or 365(c), (35 USC 154(a)(2) does not take into account, for the determination of the patent term, any application on which priority is claimed under 35 USC 119, 365(a) or (365(b).) For a C-I-P application, applicant should review whether any claim in the patent that will issue is supported by an earlier application and, if not, the applicant should consider canceling the reference to the earlier filed application. The term of a patent is not based on a claim-by-claim approach. See Notice of April 14, 1995, 60 Fed. Reg. 20,195, at 20,205.*

(complete the following, if applicable)

**X** Amend the specification by inserting, before the first line, the following sentence:

**A. 35 USC 119(e)**

**NOTE** "Any nonprovisional application claiming the benefit of one or more prior filed copending provisional applications must contain or be amended to contain in the first sentence of the specification following the title a reference to each such prior provisional application, identifying it as a provisional application, and including the provisional application number (consisting of series code and serial number)." 37 CFR § 1.78(a)(4).

<u>X</u>	"This application claims the benefit of U.S. Provisional Application(s) No(s).: APPLICATION(S) FILING DATE(S)
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Serial No. 60/152,399 September 3, 1999

**B. 35 USC 120, 121 and 365(c)**

NOTE: "Except for a continued prosecution application filed under § 1.53(d) any nonprovisional application claiming the benefit of one or more prior filed copending nonprovisionals or international applications designating the United States of America must contain or be amended to contain in the first sentence of the specification following the title a reference to such each prior application identifying it by application number (consisting of the series code and serial number) or the international application number and international filing date and indicating the relationship of the applications." Cross-references to other related applications may be made when appropriate (See § 1.14(b))." 37 CFR § 1.78(a)(2).

\_\_\_\_ This application is a \_\_\_\_ continuation; \_\_\_\_ continuation-in-part; \_\_\_\_ divisional  
of copending application(s)

serial number \_\_\_\_\_ filed on \_\_\_\_\_."

International Application \_\_\_\_\_ filed on \_\_\_\_\_ and which designated the U.S."

**NOTE:** The proper reference to a prior filed PCT application which entered the U.S. national phase is the U.S. serial number and the filing date of the PCT application which designated the U.S.

**NOTE:** (1) Where the application being transmitted adds subject matter to the International Application then the filing can be as a continuation-in-part or (2) it is desired to do so for other reasons, then the filing can be as a continuation.

**NOTE:** The deadline for entering the national phase in the U.S. for an international application was clarified in the Notice of April 28, 1987 (1079 O.G. 32 to 46) as follows:  
 "The Patent and Trademark Office considers the International application to be pending until the 22nd month from the priority date if the United States has been designated and no Demand for International Preliminary Examination has been filed prior to the expiration of the 19th month from the priority date and until the 32nd month from the priority date if a Demand for International Preliminary Examination which elected the United States of America has been filed prior to the expiration of the 19th month from the priority date, provided that a copy of the international application has been communicated to the Patent and Trademark Office within the 20 and 30 month period respectively. If a copy of the international application has not been communicated to the Patent and Trademark Office within the 20 and 30 month period respectively, the international application becomes abandoned as to the United States 20 or 30 months from the priority date

communicated to the Patent and Trademark Office within the 20 and 30 month period respectively, the international application becomes abandoned as to the United States 20 or 30 months from the priority date respectively. These periods have been placed in the rules as a paragraph (h) of § 1.494 and paragraph (l) of § 1.495. A continuing application under 35 U.S.C. 365(c) and 120 may be filed anytime during the pendency of the international application."

— "The nonprovisional application designated above, namely application \_\_\_\_\_, filed \_\_\_\_\_, claims the benefit of U.S. Provisional Applications(s) No(s).:

APPLICATION NO(S).:

FILING DATE(S):

[Where more than one reference is made, please combine all references into one sentence]

### 18. Relate Back -- 35 U.S.C. 119 Priority Claim for Prior Application

The prior U.S. application(s), including any prior International Application designating the U.S. identified above in item 17B, in turn itself claim(s) foreign priority(ies) as follows:

country	appln. no.	filed on
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The certified copy(ies) has (have)

\_\_\_\_\_ been filed on \_\_\_\_\_ in prior application \_\_, which was filed on \_\_\_\_\_ is (are) attached.

**WARNING:** The certified copy of the priority application that may have been communicated to the PTO by the International Bureau may **not** be relied on without any need to file a certified copy of the priority application **in the continuing application**. This is so because the certified copy of the priority application communicated by the International Bureau is placed in a folder and is not assigned a U.S. serial number unless the national stage is entered. Such folders are disposed of if the national stage is not entered. Therefore such certified copies may not be available if needed later in the prosecution of a continuing application. An alternative would be to physically remove the priority documents from the folders and transfer them to the continuing application. The resources required to request transfer, retrieve the folders, make suitable record notations, transfer the certified copies, enter and make a record of such copies in the Continuing Application are substantial. Accordingly, the priority documents in folders of international applications which have not entered the national stage may not be relied on. Notice of April 28, 1987 (1079 O.G. 32 to 46)

**19. Maintenance of Copendency of Prior Application**

NOTE: The PTO finds it useful if a copy of the petition filed in the prior application extending the term for response is filed with the papers constituting the filing of the continuation application. Notice of November 5, 1985 (1060 O.G. 27).

- A. ☐ Extension of time in prior application  
(This item **must** be completed and the papers filed in the prior application if the period set in the prior application has run)
- ☐ A petition, fee and response extends the term in the pending prior application until \_\_\_\_\_.
- ☐ A copy of the petition filed in prior application is attached.
- B. ☐ Conditional Petition for Extension of Time in Prior Application  
(complete this item if previous item not applicable)
- ☐ A conditional petition for extension of time is being filed in the pending prior application.
- ☐ A copy of the conditional petition filed in the prior application is attached.

**20. Further Inventorship Statement Where Benefit of Prior Application(s) Claimed**

(complete applicable item (a), (b) and/or (c) below)

- (a) ☐ This application discloses and claims only subject matter disclosed in the prior application whose particulars are set out above and the inventor(s) in this application are
- ☐ the same
- ☐ less than those named in the prior application and it is requested that the following inventor(s) identified for the prior application be deleted:

\_\_\_\_\_  
(Type name(s) of inventor(s) to be deleted)

- (b) ☒ This application discloses and claims additional disclosure by amendment and a new declaration or oath is being filed. With respect to the prior application the inventor(s) in this application are
- ☒ the same
- ☐ the following additional inventor(s) have been added

\_\_\_\_\_  
(Type name(s) of inventor(s) to be added)

- (c) ☐ The inventorship for all the claims in this application are
- ☐ the same
- ☐ not the same. An explanation, including the ownership of the various claims at the time the last claimed invention was made
- ☐ is submitted
- ☐ will be submitted

**21. Abandonment of Prior Application (if applicable)**

- ☐ Please abandon the prior application at a time while the prior application is pending or when the petition for extension of time or to revive in that application is granted and when this application is granted a filing date so as to make this application copending with said prior application.

NOTE: According to the Notice of May 13, 1983 (103 TMOG 6-7) the filing of a continuation or continuation-in-part application is a proper response with respect to a petition for extension of time or a petition to revive and should include the express abandonment of the prior application conditioned upon the granting of the petition and the granting of a filing date to the continuing application.

**22. Petition for Suspension of Prosecution for the Time Necessary to File an Amendment**

**WARNING:** *"The claims of a new application may be finally rejected in the first Office Action in those situations where (A) the new application is a continuing application of, or a substitute for, an earlier application, and (B) all the claims of the new application (1) are drawn to the same invention claimed in the earlier application, and (2) would have been properly finally rejected on the grounds of art of record in the next Office Action if they had been entered in the earlier application." MPEP, § 706.07(b) 7th ed.*

**NOTE:** *Where it is possible that the claims on file will give rise to a first action final for this continuation application and for some reason an amendment cannot be filed promptly (e.g., experimental data is being gathered) it may be desirable to file a petition for suspension of prosecution for the time necessary.*

*(check the next item, if applicable)*

☐ There is provided herewith a Petition to Suspend Prosecution for the Time Necessary to File An Amendment (New Application Filed Concurrently)

**23. SMALL ENTITY (35 CFR § 1.28(a))**

☒ Applicant has established small entity status by the filing of a statement in parent application Serial number 60/152,399 on September 3, 1999.

☒ A copy of the Statement previously filed is included.

**WARNING:** *See 37 CFR § 1.28(a).*

**WARNING:** *"A small entity status must not be established when the person or persons signing the...statement can unequivocally make the required self-certification." M.P.E.P. § 509.03, 7<sup>th</sup> ed. (Emphasis added)*

**24 NOTIFICATION IN PARENT APPLICATION OF THIS FILING**

☐ A notification of the filing of this *(check one of the following)*

- ☐ continuation
- ☐ continuation-in-part
- ☐ divisional

is being filed in the parent application, from which this application claims priority under 35 USC § 120.

U.S. Express Mail Label No. EL450973040US

## PATENT

(Small Entity—Independent Inventor [7-1]—page 1 of 2)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

(check the following item, if desired)

NOTE: The following verification statement need not be made in accordance with the rules published on Oct. 10, 1997, 62 Fed. Reg. 52131, effective Dec. 1, 1997.

NOTE: "The presentation to the Office (whether by signing, filing, submitting, or later advocating) of any paper by a party, whether a practitioner or non-practitioner, constitutes a certification under § 10.18(b) of this chapter. Violations of § 10.18(b)(2) of this chapter by a party, whether a practitioner or non-practitioner, may result in the imposition of sanctions under § 10.18(c) of this chapter. Any practitioner violating § 10.18(b) may also be subject to disciplinary action. See §§ 10.18(d) and 10.23(c)(15)." 37 C.F.R. § 1.4(d)(2).

☒ I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Wayne Harlan

Name of inventor

Wayne Harlan  
Signature of Inventor

Date September 3, 1999

Name of inventor

Signature of Inventor

Date \_\_\_\_\_

Name of inventor

Signature of Inventor

Date \_\_\_\_\_

PATENT APPLICATION

POLYMER-MODIFIED ASPHALT EMULSION

CROSS-REFERENCE TO RELATED APPLICATIONS

5           This application claims the benefit of the filing of U.S. Provisional Patent Application Serial  
No. 60/152,399, entitled *Polymer-Modified Asphalt Emulsion*, filed on September 3, 1999, and the  
specification thereof is incorporated herein by reference.

BACKGROUND OF THE INVENTION

10   Field of the Invention (Technical Field):

          The present invention relates to polymer-modified asphalt emulsions, and a method and  
apparatus to make and use the asphalt emulsions for repairing roads and pavement. More particularly,  
the invention relates to stable, asphalt polymer compositions that can be applied at ambient  
temperatures.

15   Background Art:

          Often conventional asphalt does not retain sufficient elasticity during use, and, also, exhibits a  
plasticity range which is too narrow for use in many modern applications such as road construction. To  
overcome this problem, various polymers have been added to asphalt to improve physical and  
mechanical performance. The characteristics of road asphalt and the like can be greatly improved by  
incorporating an elastomeric type polymer, or a random or block copolymer of styrene and a conjugated  
diene. Consequently, polymer-modified asphalt is routinely used in the road construction/maintenance  
and roofing industries. Polymer-modified asphalt generally comprises styrene butadiene-based  
polymers, which have raised softening point, increased viscoelasticity, enhanced strain recovery, and  
improved low temperature strain characteristics. However, the technical challenge remains in producing  
a polymer modified asphalt or polymer asphalt emulsion that is stable for long periods of time, that will  
strongly bind to aggregate, and in the case of the emulsions, that can be easily applied at ambient  
temperatures.



The durability of road pavement is greatly enhanced by the addition of a polymer. The polymer is added for the purpose of reducing the heat sensitivity of the asphalt by increasing or extending the plasticity range, and increasing the resistance to deformation and the breaking point. It has also been shown that the performance of a properly selected asphalt polymer composition is superior to that of an asphalt not containing an added polymer. However, the problems of constituent compatibility encountered in attempts to obtain the best compromise between the performance and storage stability are difficult to overcome. European Patent EP458386 relates to a process for obtaining an asphalt polymer composition that is stable under conditions of fluidity prevailing during hot storage. The process consists of mixing at a temperature of 200 to 250°C, 85 to 98 weight percent of a selected asphalt, and 15 to 2 weight percent of a sequenced styrene/butadiene/styrene copolymer (SBS).

Polymer asphalt mixtures that are employed at the present time in heavy load applications, such as road construction and repair, often do not have the optimum characteristics at low enough polymer concentrations to consistently meet the increasing structural and workability requirements imposed on roadway structures in their construction. Common practice is to add the desired level of a single polymer, and a cross-linking agent, such as sulfur, until the desired asphalt properties are met. However, the relatively high cost of the polymer adds significantly to the overall cost of the resulting asphalt/polymer mix. Thus, it is highly advantageous to develop a polymer asphalt mix that is low in polymer concentration but still has the requisite properties. Due to the large quantities involved, cost factors weigh heavily in the practical application of any polymer asphalt mixture.

Grubba, U.S. Patent No. 5,795,929 appears to have overcome the high polymer/asphalt ratio and the incompatibility problems associated with prior polymer-modified asphalt emulsions. Grubba found that when sulfur is added as a cross-linking agent to an asphalt mixture containing both radial and linear styrene-diene copolymers (total 0.5-20 wt.%) significant property enhancements occur. Interestingly, no property enhancements were found in the absence of added sulfur. Asphalt emulsions can also be prepared utilizing Grubba's polymer modified mixture. In this case polymer-modified asphalt emulsions were prepared consisting of 60 to 80% asphalt polymer to 40 to 20% water, respectively, and an emulsifying agent. One disadvantage of the Grubba process is the need for an emulsification mill.

The emulsification mill operates at temperatures between 190° F to about 210°F, and slices the asphalt-polymer mix finely to mix it with the water to form the emulsion. The present invention does not require an emulsification mill, and the polymer modified asphalt emulsion can be prepared at ambient temperatures.

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Asphalt emulsions are desirable in many applications because of improved handling and application at temperatures lower than hot/mix asphalt resulting from the presence of an asphalt solvent or carrier phase, for example, water. For example, hot/mix asphalt, and combinations of asphalt, aggregate and a single polymer, are commonly heated to, and applied at, a temperature of 350-450°F to achieve the requisite plasticity. In comparison, an asphalt emulsion is typically heated to, and applied at, temperatures between 130-170°F to achieve the same working characteristics.

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A basic emulsification requires three components: asphalt, a carrier phase (e.g., water) and an emulsifying agent. A typical emulsion is formed through addition of asphalt, any desired performance-enhancing additives, an emulsifying agent and about 20-40 weight percent of water. Once the emulsion is applied, the water evaporates, leaving the asphalt structurally bound to the aggregate or other paving material. One advantage of water-based emulsified asphalt products is that they do not use or release volatile organic compounds in quantities associated with hot-mix asphalt. Hot-mix asphalt is generally diluted with hydrocarbon solvents such as diesel fuel or naphtha to improve the workability of the product during application.

15

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Heightened environmental awareness has stimulated increased usage of emulsified asphalt in the road-paving industry. The type of emulsifier employed is determined by the desired application of the asphalt emulsion. In the case of rapid-set emulsions (mainly used for repair work of old pavement), the emulsion is applied on the existing surface and aggregate is spread on top. After the water from the emulsion has evaporated, an intimate mixture of asphalt and stone with good load-bearing capacity is formed. There are two basic types of emulsions: anionic emulsions and cationic emulsions. While nonionic emulsions also exist, they are used less frequently than anionic and cationic emulsions. The advantage of anionic emulsion lies in the relatively low cost of the emulsifying agents. However, as most

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of the aggregates used are negatively charged, for example, quartz and granite, the electrostatic repulsion between the negatively charged asphalt emulsion and the negatively charged stones causes inferior adhesion. This results in the asphalt separating from the stones, or what is generally known as the asphalt/stripping problem. This problem is also encountered in hot/mix applications and when cutback asphalt is used.

The quality of the road surface is generally dependent upon the strength of the bonds between the asphalt and the aggregate after curing of the composition. Poor surface performance is due to poor adhesion, which results in asphalt stripping off the aggregate surface. Asphalt compositions also have relatively poor adhesion to aggregate in the presence of water, because the aggregate prefers to be wetted by the water rather than the asphalt. As a result, the water in the emulsion interferes with the bond between the aggregate and the asphalt. The result is the formation of potholes. To reduce water-induced debonding of asphalt from the stone surface, it is common to add surface-active amines or diamines to the asphalt. The patent literature sets forth a large number of compounds that can be used to improve adhesion of asphalt to aggregate. See, e.g., Schilling, U.S. Patent No. 5,667,578.

The present invention provides a polymer-enhanced asphalt that can be applied at ambient temperature. The present invention also provides an improved mechanical stirring apparatus.

#### SUMMARY OF THE INVENTION (DISCLOSURE OF THE INVENTION)

The present invention is directed to a polymer-modified asphalt emulsion and a mixing/stirring/blending apparatus particularly useful for road and pavement repairs and potholes. The polymer-modified asphalt emulsion comprises bitumen, a block copolymer comprising styrene, a rosin ester and a cationic asphalt emulsion. The mixture can be applied at ambient temperature.

The preferred block copolymer comprising styrene is styrene-butadiene-styrene (SBS), although other block copolymers may be utilized in accordance with the invention. The block copolymer may be present in powdered form. The emulsion preferably comprises between approximately 0.5 and 20

percent by weight of SBS and most preferably between approximately 2 and 15 percent by weight of SBS.

The bitumen preferably has a petroleum asphalt pen number of 10mm penetration. The emulsion preferably comprises between approximately 2 and 6 percent by weight bitumen and most preferably between approximately 4 and 5 percent by weight bitumen.

The rosin preferably comprises a high acid number and is preferably dimerized. The emulsion preferably comprises between approximately 0.02 and 2 percent by weight rosin and most preferably between approximately 1 and 2 percent by weight rosin.

The emulsion preferably comprises between approximately 20 and 40 percent by weight of water and most preferably between approximately 30 and 35 percent by weight of water.

The cationic asphalt emulsion preferably comprises an amine, such as a quaternary amine and an emulsifying agent, such as amines, primary amines, diamines, quaternary amines, imidazoline and combinations thereof. Preferred emulsifying agents include, but are not limited to, imidazoline dodecyl phenol, quaternary diamine phenol and combinations thereof. The emulsion preferably comprises between approximately 50 and 80 percent by weight of cationic emulsion and most preferably between approximately 60 and 70 percent by weight of cationic emulsion.

In an alternative embodiment, the emulsion further comprises an additional amine which is added to the bitumen/rosin reaction. The emulsion preferably comprises between approximately 0.2 and 0.3 percent by weight. The preferred additional amine is ditolamine.

The invention further comprises a method of making a polymer-enhanced asphalt emulsion, comprising: a) mixing a block copolymer comprising styrene, rosin, and bitumen; b) heating the block copolymer/rosin/bitumen mixture; and c) mixing the block copolymer/rosin/bitumen mixture with cationic asphalt emulsion.

In the preferred embodiment, the block copolymer and rosin are mixed to form a dry mixture and then this dry mixture is added to the bitumen. The block copolymer may be powdered.

5           The preferred compositions and reactants are discussed above. The mixture may be applied at ambient temperature to the surface being repaired.

10           The present invention also is directed to a mixer/stirrer/blender apparatus comprising a shaft, a plate or blade with at least one opening in the blade. Preferably, there are a plurality of plates (most preferably three plates), and a plurality of openings in at least two of the plates. Preferably there are no openings in the central plate. The plates are preferably circular. For certain applications (e.g. use in a 55-gallon drum), the plates preferably comprise an approximately five-inch radius.

15           The openings in the plates are preferably circular. Preferably, there are four openings in each plate (that has openings). Preferably, each opening is spaced at a ninety-degree angle from its neighboring opening with respect to a center of the plate; centers of the four openings are located at a point approximately seventy percent of a distance from a center of the plate to an edge of the plate; and a radius of each of the four openings is approximately twenty percent of a distance from a center of the plate to an edge of the plate.

20           There are spacers on the shaft interposed between the plurality of plates. These spacers are preferably approximately 1/8 inch thick.

25           The apparatus prevents shear of the mixture being processed.

A primary object of the present invention is to provide a polymer-enhanced asphalt that can be applied at ambient temperature to selected aggregate to pave or repair roads, pavement or other surfaces.

A further object of the invention is to provide an asphalt emulsion with improved characteristics for handling, storage, and application.

5 A further object of the invention is to provide an asphalt emulsion that is applied at ambient temperatures with minimal release of volatile organic compounds (VOC) into the environment.

Another object of the invention is to provide an improved stirring/mixing/blending apparatus.

10 A primary advantage of the present invention is the storability of the polymer-enhanced asphalt emulsion.

Another advantage of the present advantage is the high degree of bonding between the asphalt emulsion and the aggregate.

15 Another advantage of the present advantage is that the mixture can be varied over a wide compositional range depending on the application.

20 Another advantage of the present invention is the uniform appearance of the asphalt-aggregate patch to the unrepaired portion of the road or pavement.

Other objects, advantages and novel features, and further scope of applicability of the present invention will be set forth in part in the detailed description to follow, taken in conjunction with the accompanying drawings, and in part will become apparent to those skilled in the art upon examination of  
25 the following, or may be learned by practice of the invention. The objects and advantages of the invention may be realized and attained by means of the instrumentalities and combinations particularly pointed out in the specification below.

### BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated into and form a part of the specification, illustrate several embodiments of the present invention and, together with the description, serve to explain the principles of the invention. The drawings are only for the purpose of illustrating a preferred embodiment of the invention and are not to be construed as limiting the invention. In the drawings:

Fig. 1 is a diagram of one of the outer stirrer blades of the mechanical stirring apparatus of the invention;

Fig. 2 is a component diagram of the mechanical stirring apparatus; and

Fig. 3 is a chemical structural representation of the rosin (Sylvaros PR 295) preferably used in the emulsification process of the invention.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

#### (BEST MODES FOR CARRYING OUT THE INVENTION)

The present invention is of a polymer-enhanced asphalt emulsion comprising bitumen (e.g., bitumen (AC-10) from Frontier, Cheyenne, Wyoming wherein the 10 stands for a petroleum asphalt pen number of 10 for a 10mm penetration, standard test), a block polymer comprising styrene (e.g. styrene-butadiene-styrene (SBS)), a rosin ester with high acid number (e.g. Sylvaros PR-295 (chemical structure illustrated in Fig. 3) from Arizona Chemical Company, Panama City, Florida), and a cationic asphalt emulsion. Of course, other types of styrene containing block polymers known in the art may be suitable in lieu of or in addition to SBS block copolymers, for example, but not limited to styrene-ethylene-butylene-styrene (SBES) block copolymer. The term "SBS block polymer", as used throughout the specification and claims, is intended to include all styrene containing block polymers or copolymers.

As used throughout the specification and claims, the terms "bitumen" and "asphalt" are used interchangeably. The SBS block polymer is preferably mixed with the rosin to form a dry mixture.

The rosin is preferably a high acid number rosin ester and preferably dimerized. The rosin preferably ranges between approximately 0.02 percent by weight and 2 percent by weight, and most preferably between approximately 1 percent by weight and 2 percent by weight.

5           The dry mixture is slowly added to the heated asphalt, and heated for preferably one to two hours at 300° F - 500° F. The heated asphalt-polymer is then added to an already prepared cationic asphalt emulsion at ambient temperature. With the specialized mixer blade of the invention, the asphalt-polymer mixes almost immediately with the asphalt emulsion with no separation or incompatibility problems observed.

10           The emulsion comprises some water, dependent upon the desired flow and cure characteristics of the final mixture. The quantity and type of emulsifying agent used are dictated by the desired use of the emulsion. Other molecules comprising hydroxyl groups may also be added to adjust characteristics of the emulsion. The quantity and type of emulsifying agent used in the present invention are consistent  
15           with existing asphalt and polymer-modified emulsions known in the art. Known cationic emulsifying agents that can be used in the present invention include chemical agents and clay agents. Chemical agents include, but are not limited to, nitrogen containing molecules, such as, but not limited to, amines, for example, but not limited to, primary amines, secondary amines, quaternary amines, monoamines, diamines and other polyamines. Clay agents comprise clays, such as, but not limited to, bentonite clays  
20           and the like. In particular, imidazoline dodecyl phenol and quaternary diamine phenol are used separately or in combination. The cationic emulsion preferably ranges between 50-80 percent by weight, and most preferably between approximately 60-70 percent by weight.

25           For the present invention, the amount of water in the final polymer-modified asphalt emulsion preferably ranges between approximately 20 and 40 percent by weight and most preferably approximately 32 percent by weight. The preferred weight percent of SBS in the final asphalt polymer emulsion preferably ranges between approximately 2 percent by weight and 20 percent by weight, and most preferably approximately between approximately 2 percent by weight and 15 percent by weight.



The final asphalt mixture can be stored in a sealed container for at least six (6) months, perhaps longer, and used as needed.

In an alternative embodiment, the asphalt emulsion further comprises an additional amine, preferably a di-tallow quaternary amine, for example, but not limited to, DTDMAC (di-tallow, di-methyl ammonium chloride) or di-tallow amine. This amine is in addition to the amine in the cationic emulsion. This amine is added, in a small amount, to the rosin/bitumen/SBS reaction to allow particles to better or completely disperse when in the mixer apparatus of the present invention. The additional amine is present in an amount of preferably between approximately 0.2 percent by weight and 0.3 percent by weight.

The invention additionally comprises methods to repair potholes and cracked pavement, especially employing the composition of the invention described above. An example of the method when used to repair a pot hole approximately three to four inches in depth follows: The pothole is filled with approximately 3/8 inch washed silicious aggregate or other paving or surfacing material. Deeper pot holes are filled with larger, washed aggregate provided that approximately 3/8 inch aggregate is layered atop the larger aggregate. The prepared asphalt polymer emulsion, the composition of the present invention, is poured into the aggregate filled hole to a level approximately equal to that of the pavement. A small amount of additional 3/8 inch aggregate may be added to the hole. After approximately twenty to thirty minutes the asphalt/aggregate mixture is cured to the point such that the mixture can be compressed and leveled with the pavement, resulting in a patch that is uniform in appearance to the unrepaired portion of the roadway pavement.

As to cracked pavement, for pavement cracks less than approximately one (1) inch in width, the crack is preferably routed with a commercial pavement router to at least one (1) inch in width, cleared of loose sand or gravel, and filled with approximately 1/8 to 1/4 inch washed silicious aggregate. The fill step is repeated as in the case of repairing the pothole, above.

Referring to Figs. 1 and 2, the invention additionally comprises a mechanical stirrer/mixer/blender that is used to mix the polymer/rosin mix with the asphalt and later used to mix the asphalt polymer mixture with the cationic asphalt emulsion. This facilitates the mixing of these respective components to a point achieving approximate homogeneity. The stirrer preferably comprises a shaft **10**, a plurality of stirrer blades **14**, and a plurality of spacers **12**. The shaft **10** may be disposed in any container (e.g. a 55-gallon drum) for conducting the mixing on site. An electric drill can be used to drive the shaft **10**.

The stirrer preferably has three stirrer blades. The blades are preferably approximately 1/4 inch thick and preferably disposed on top of each other with 1/8 inch washers or spacers. A useful material for the blade is aluminum, but other materials may be utilized. The blades are preferably circular with a radius of approximately five (5) inches. The stirrer blades are attached to one end of the shaft **10**. Each outer blade **14** preferably has circular openings **16** (e.g. four openings), ninety degrees from one another, that are preferably centered 3 1/2 inches from the center of the blade **18**. Preferably, the diameter of the openings is approximately 2 inches.

Although circular openings are shown in the drawings, oval openings could be utilized. The purpose of circular or oval openings is to avoid shear. When the liquid enters the hole, it acts as a pump and pumps the liquid over the surface of the blade. An opening of sharp edges (e.g. square openings) may cause shear. Radial velocity is used to achieve the pumping and stirring of the mixture. Likewise the blades may have more or less than four openings.

#### Industrial Applicability:

The invention is further illustrated by the following non-limiting examples.

#### Example 1 (3.0% SBS)

Bitumen (43 lbs., AC-10, Frontier, Cheyenne, Wyoming) was heated to a temperature of between approximately 300° F and 500° F. Powdered SBS with a typical molecular weight ( $M_w$ ) of 1 to 1.5 million (8.6 lbs., 31/69 S/B ratio, Dexco Polymers, Houston Texas) was mixed with a rosin-ester with high acid number (0.45 lbs., Sylvaros PR 295, Arizona Chemical Co.). The polymer/rosin mixture was slowly

added with gentle stirring using the mixing/stirring apparatus of the present invention to the bitumen at approximately 300° F to 500° F. until all the polymer/rosin mixture was added. The polymer asphalt mixture was maintained at approximately 300° F to 500° F for one to two hours and then mixed with the mixer/stirrer of the invention. The heated polymer asphalt mixture was then added to approximately  
5 thirty (30) gallons of already prepared cationic asphalt emulsion at ambient temperature. The polymer-asphalt emulsion was rapidly mixed (approximately 300 to 600 rpm) with the mixer/stirrer for ten minutes.

Example 2 (4.0% SBS)

The same preparation method was used as described for Example 1 for the corresponding  
10 amounts of materials:

Bitumen:	43 lbs
SBS:	12.5 lbs.
Rosin:	0.625 lbs.
Asphalt Emulsion:	30 gallons

Example 3 (5.0% SBS)

The same preparation method was used as described for Example 1 for the corresponding  
15 amounts of materials:

Bitumen:	43 lbs.
SBS:	17.2 lbs.
Rosin:	0.96 lbs.
Asphalt Emulsion:	30 gallons

Example 4 (6.0% SBS)

The same preparation method was used as described for Example 1 for the corresponding amounts of materials:

5	Bitumen:	50 lbs
	SBS:	19.0 lbs.
	Rosin:	1.0 lbs.
	Asphalt Emulsion:	30 gallons

Example 5

The mixture of Example 1 was tested to repair a pothole. After 11 months to-date, the asphalt mixture of the present invention remains in good condition, with no evidence of shrinkage, cracking, sinking or other wear.

Example 6

The mixture of Example 4 was tested to repair a pothole. After 8 months, to-date, the asphalt mixture of the present invention remains in good condition, with no evidence of shrinkage, cracking, sinking or other wear.

The preceding examples can be repeated with similar success by substituting the generically or specifically described reactants and/or operating conditions of this invention for those used in the preceding examples. In particular, the weight percent of SBS in the final asphalt polymer emulsion can vary from approximately 2% to approximately 20%, and the corresponding weights and volume of the other constituents adjusted accordingly.

Although the invention has been described in detail with particular reference to these preferred embodiments, other embodiments can achieve the same results. Variations and modifications of the present invention will be obvious to those skilled in the art and it is intended to cover in the appended

claims all such modifications and equivalents. The entire disclosures of all references, applications, patents, and publications cited above are hereby incorporated by reference.

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CLAIMS

What is claimed is:

- 5           1.       A polymer-enhanced asphalt emulsion comprising:
- bitumen;
- a block copolymer comprising styrene;
- rosin; and
- cationic asphalt emulsion.
- 10           2.       The emulsion of claim 1 wherein said block copolymer comprising styrene comprises styrene-butadiene-styrene (SBS).
- 15           3.       The emulsion of claim 1 wherein said bitumen comprises bitumen with a petroleum asphalt pen number of 10mm penetration.
4.       The emulsion of claim 1 comprising between approximately 2 and 6 percent by weight bitumen.
- 20           5.       The emulsion of claim 4 comprising between approximately 4 and 5 percent by weight bitumen.
6.       The emulsion of claim 1 wherein said rosin comprises a high acid number.
- 25           7.       The emulsion of claim 1 wherein said rosin is dimerized.
8.       The emulsion of claim 1 comprising between approximately 0.02 and 2 percent by weight rosin.

9. The emulsion of claim 7 comprising between approximately 1 and 2 percent by weight rosin.

5 10. The emulsion of claim 1 comprising between approximately 20 and 40 percent by weight of water.

11. The emulsion of claim 10 comprising between approximately 30 and 35 percent by weight of water.

10 12. The emulsion of claim 1 comprising between approximately 0.5 and 20 percent by weight of block polymer comprising styrene.

13. The emulsion of claim 12 comprising between approximately 2 and 15 percent by weight of block polymer comprising styrene.

15 14. The emulsion of claim 1 wherein said cationic asphalt emulsion comprises an amine.

15. The emulsion of claim 14 wherein said amine comprises a quaternary amine.

20 16. The emulsion of claim 1 wherein said cationic emulsion comprises at least one emulsifying agent selected from the group consisting of amines, primary amines, diamines, quaternary amines, imidazoline amines and combinations thereof.

25 17. The emulsion of claim 16 wherein said cationic emulsion comprises at least one emulsifying agent selected from the group consisting of imidazoline dodecyl phenol, quaternary diamine phenol and combinations thereof.

18. The emulsion of claim 1 comprising between approximately 50 and 80 percent by weight of cationic emulsion.

19. The emulsion of claim 18 comprising between approximately 60 and 70 percent by weight of cationic emulsion.

5 20. The emulsion of claim 1 wherein said block copolymer comprises powder.

21. The emulsion of claim 1 further comprising an additional amine.

22. The emulsion of claim 21 wherein said additional amine is added to the bitumen/rosin.

10 23. The emulsion of claim 21 wherein said additional amine comprises between approximately 0.2 and 0.3 percent by weight.

24. The emulsion of claim 21 wherein said additional amine comprises ditlaloamine.

15 25. A method of making a polymer-enhanced asphalt emulsion, the method comprising the steps of:

- 20
- a) mixing block copolymer comprising styrene, rosin, and bitumen;
  - b) heating the block copolymer/rosin/bitumen mixture; and
  - c) mixing the block copolymer/rosin/bitumen mixture with cationic asphalt emulsion.

26. The method of claim 25 wherein step a) comprises the steps of mixing the block copolymer and rosin to form a dry mixture and adding the dry mixture to the bitumen.

25 27. The method of claim 25 wherein step c) comprises mixing a cationic asphalt emulsion comprising an emulsifying agent selected from the group consisting of amines, primary amines, quaternary amines, diamines, imidazolene amines and combinations thereof.



28. The method of claim 25 wherein step c) comprises mixing a cationic asphalt emulsion comprising an emulsifying agent selected from the group consisting of imidazoline dodecyl phenol, quaternary diamine phenol and combinations thereof.

5 29. The method of claim 25 wherein step a) comprises mixing powdered block copolymer.

30. The method of claim 25 wherein step c) comprises mixing using a mixer/stirred/blender apparatus comprising a shaft, a plurality of plates attached thereto, and a plurality of openings in at least two of the plates.

10 31. The method of claim 25 further comprising the step of applying the emulsion to a surface at ambient temperature.

15 32. An apparatus for mixing/stirring/blending asphalt comprising:  
a shaft;  
at least one plate attached to said shaft; and  
a plurality of openings in said at least one plate.

20 33. The apparatus of claim 32 comprising three plates.

34. The apparatus of claim 33 wherein a central plate has no openings.

35. The apparatus of claim 32 wherein said plate(s) are circular.

25 36. The apparatus of claim 35 wherein said plate(s) comprise an approximately five-inch radius.

37. The apparatus of claim 32 wherein said plate(s) comprise circular openings.

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## POLYMER-MODIFIED ASPHALT EMULSION

### ABSTRACT OF THE DISCLOSURE

5           A polymer-modified asphalt emulsion and a mixing/stirring/blending apparatus particularly useful  
for road and pavement repairs and potholes. The polymer-modified asphalt emulsion comprises  
bitumen, a block copolymer comprising styrene, a rosin ester and a cationic asphalt emulsion. The  
mixture can be applied at ambient temperature.

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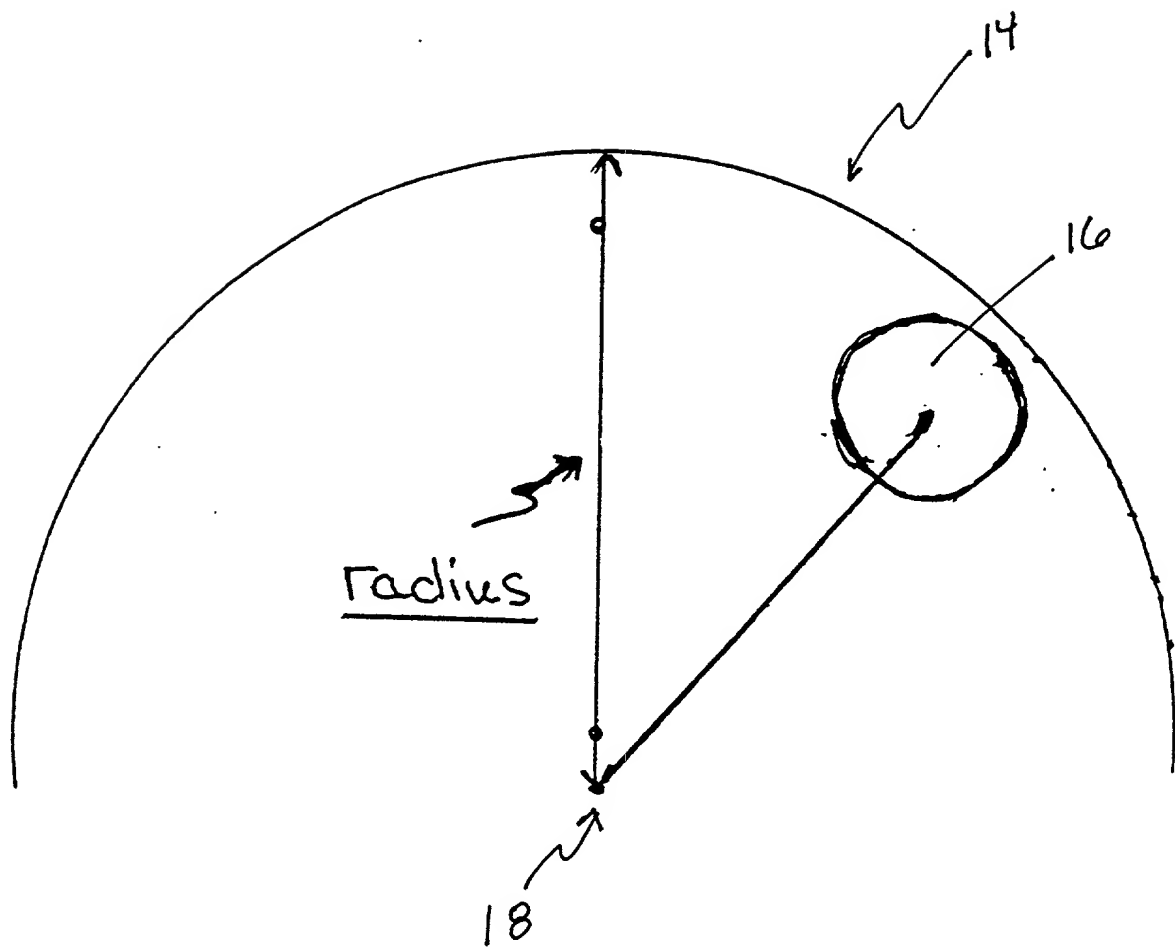


Fig. 1

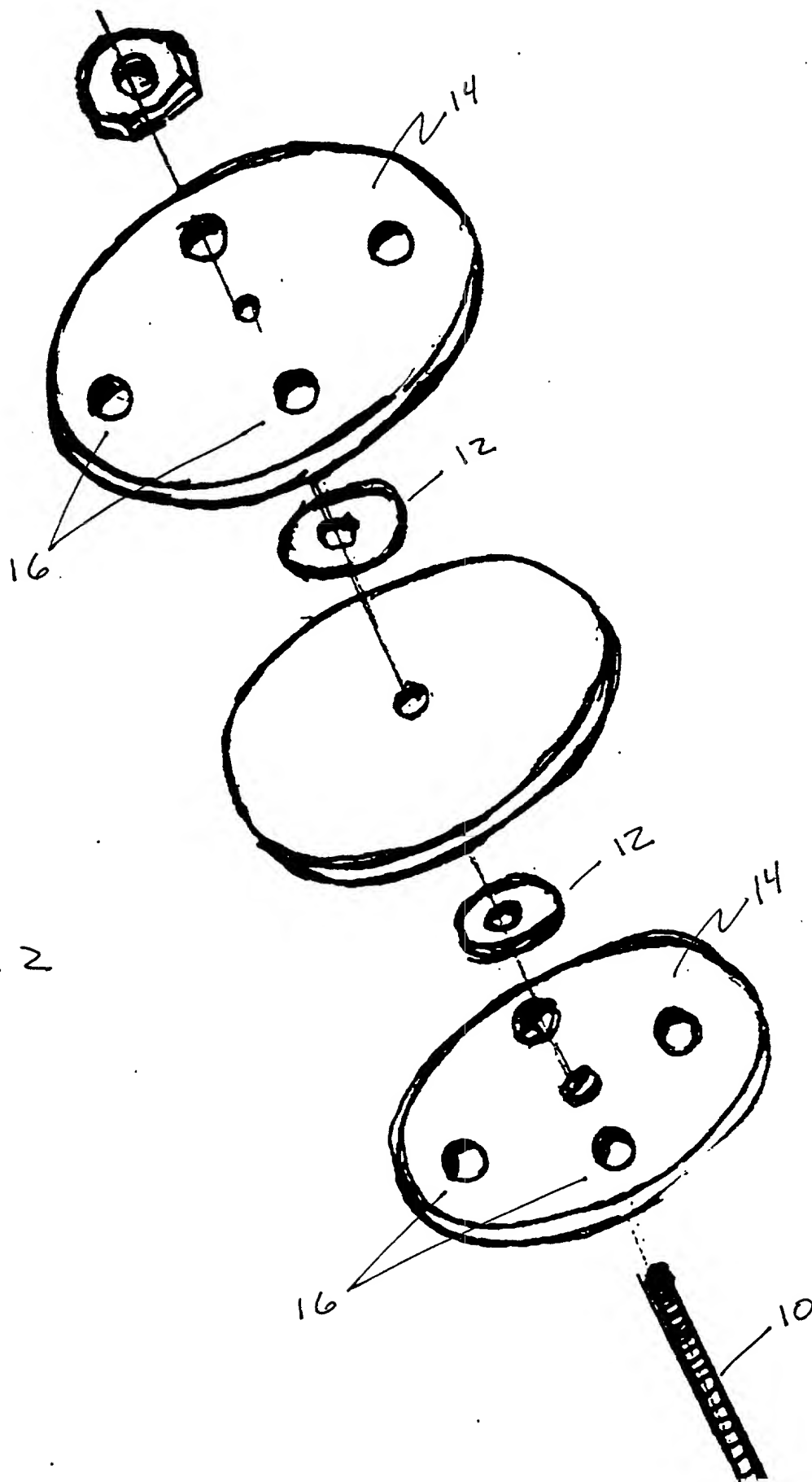
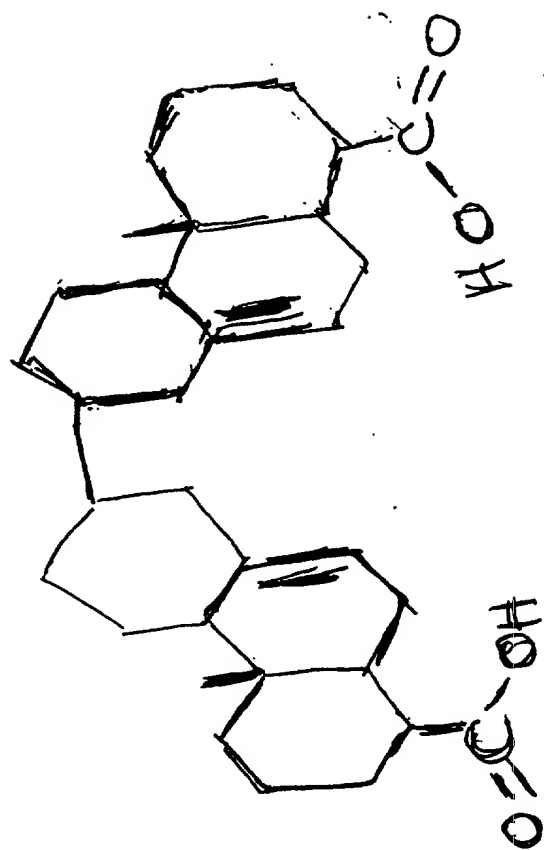


Fig. 2



Dimer Rosin ester  
(free acid Hydrogen)

m.w. 480

Fig. 3

Practitioner's Docket No. 30882UT1001**PATENT****COMBINED DECLARATION AND POWER OF ATTORNEY**(ORIGINAL, DESIGN, NATIONAL STAGE OF PCT, SUPPLEMENTAL, DIVISIONAL,  
CONTINUATION, OR C-I-P)

As a below named inventor, I hereby declare that:

**TYPE OF DECLARATION**

This declaration is of the following type:

*(check one applicable item below)*☒ original.☐ design.NOTE: With the exception of a supplemental oath or declaration submitted in a reissue, a supplemental oath or declaration is not treated as an amendment under 37 CFR 1.312 (Amendments after allowance).  
M.P.E.P. § 714.16, 7th Edition.☐ supplemental.NOTE: If the declaration is for an International Application being filed as a divisional, continuation or continuation-in-part application, do not check next item; check appropriate one of last three items.☐ national stage of PCT.

NOTE: If one of the following 3 items apply, then complete and also attach ADDED PAGES FOR DIVISIONAL, CONTINUATION OR C-I-P.

NOTE: See 37 C.F.R. § 1.63(d) (continued prosecution application) for use of a prior nonprovisional application declaration in the continuation or divisional application being filed on behalf of the same or fewer of the inventors named in the prior application.

☐ divisional.☐ continuation.

NOTE: Where an application discloses and claims subject matter not disclosed in the prior application, or a continuation or divisional application names an inventor not named in the prior application, a continuation-in-part application must be filed under 37 C.F.R. § 1.53(b) (application filing requirements — nonprovisional application).

☐ continuation-in-part (C-I-P).**INVENTORSHIP IDENTIFICATION****WARNING:** If the inventors are each not the inventors of all the claims, an explanation of the facts, including the ownership of all the claims at the time the last claimed invention was made, should be submitted.My residence, post office address and citizenship are as stated below, next to my name.  
I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter that is claimed, and for which a patent is sought on the invention entitled:**TITLE OF INVENTION**POLYMER-MODIFIED ASPHALT EMULSION

09654932 "090100

## SPECIFICATION IDENTIFICATION

the specification of which:

(complete (a), (b), or (c))

(a) ☐ is attached hereto.

NOTE: "The following combinations of information supplied in an oath or declaration filed on the application filing date with a specification are acceptable as minimums for identifying a specification and compliance with any one of the items below will be accepted as complying with the identification requirement of 37 CFR 1.63:

"(1) name of inventor(s), and reference to an attached specification which is both attached to the oath or declaration at the time of execution and submitted with the oath or declaration on filing;

"(2) name of inventor(s), and attorney docket number which was on the specification as filed;  
or

"(3) name of inventor(s), and title which was on the specification as filed."

Notice of July 13, 1995 (1177 O.G. 60).

(b) ☐ was filed on September 1, 2000, as ☒ Serial No. 09 /  
or ☐ \_\_\_\_\_  
and was amended on \_\_\_\_\_ (if applicable).

NOTE: Amendments filed after the original papers are deposited with the PTO that contain new matter are not accorded a filing date by being referred to in the declaration. Accordingly, the amendments involved are those filed with the application papers or, in the case of a supplemental declaration, are those amendments claiming matter not encompassed in the original statement of invention or claims. See 37 C.F.R. § 1.67.

NOTE: "The following combinations of information supplied in an oath or declaration filed after the filing date are acceptable as minimums for identifying a specification and compliance with any one of the items below will be accepted as complying with the identification requirement of 37 CFR 1.63:

"(A) application number (consisting of the series code and the serial number, e.g., 08/123,456);

"(B) serial number and filing date;

"(C) attorney docket number which was on the specification as filed;

"(D) title which was on the specification as filed and reference to an attached specification which is both attached to the oath or declaration at the time of execution and submitted with the oath or declaration; or

"(E) title which was on the specification as filed and accompanied by a cover letter accurately identifying the application for which it was intended by either the application number (consisting of the series code and the serial number, e.g., 08/123,456), or serial number and filing date. Absent an, statement(s) to the contrary, it will be presumed that the application filed in the PTO is the application which the inventor(s) executed by signing the oath or declaration."

M.P.E.P. § 601.01(a), 7th Ed.

(c) ☐ was described and claimed in PCT International Application No. \_\_\_\_\_, filed on \_\_\_\_\_ and as amended under PCT Article 19 on \_\_\_\_\_ (if any).



**SUPPLEMENTAL DECLARATION (37 C.F.R. § 1.67(b))**

(complete the following where a supplemental declaration is being submitted)

- ☐ I hereby declare that the subject matter of the
- ☐ attached amendment
- ☐ amendment filed on \_\_\_\_\_

was part of my/our invention and was invented before the filing date of the original application, above-identified, for such invention.

**ACKNOWLEDGEMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR**

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information, which is material to patentability as defined in 37, Code of Federal Regulations, § 1.56,

(also check the following items, if desired)

- ☒ and which is material to the examination of this application, namely, information where there is a substantial likelihood that a reasonable Examiner would consider it important in deciding whether to allow the application to issue as a patent, and
- ☐ in compliance with this duty, there is attached an information disclosure statement, in accordance with 37 C.F.R. § 1.98.

**PRIORITY CLAIM (35 U.S.C. §§ 119(a)-(d))**

NOTE: "The claim to priority need be in no special form and may be made by the attorney or agent if the foreign application is referred to in the oath or declaration as required by § 1.63. The claim for priority and the certified copy of the foreign application specified in 35 U.S.C. 119(b) must be filed in the case of an interference (§ 1.630), when necessary to overcome the date of a reference relied upon by the examiner, when specifically required by the examiner, and in all other situations, before the patent is granted. If the claim for priority or the certified copy of the foreign application is filed after the date the issue fee is paid, it must be accompanied by a petition requesting entry and by the fee set forth in § 1.17(f). If the certified copy is not in the English language, a translation need not be filed except in the case of interference; or when necessary to overcome the date of a reference relied upon by the examiner; or when specifically required by the examiner, in which event an English language translation must be filed together with a statement that the translation of the certified copy is accurate." 37 C.F.R. § 1.55(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §§ 119(a)-(d) of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

(complete (d) or (e))

- (d) ☒ no such applications have been filed.
- (e) ☐ such applications have been filed as follows.

NOTE: Where item (c) is entered above and the International Application which designated the U.S. itself claimed priority check item (e), enter the details below and make the priority claim.

**PRIOR FOREIGN/PCT APPLICATION(S) FILED WITHIN 12 MONTHS  
(6 MONTHS FOR DESIGN) PRIOR TO THIS APPLICATION  
AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. § 119(a)-(d)**

COUNTRY (OR INDICATE IF PCT)	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 37 USC 119
			<input type="checkbox"/> YES    NO <input type="checkbox"/>
			<input type="checkbox"/> YES    NO <input type="checkbox"/>
			<input type="checkbox"/> YES    NO <input type="checkbox"/>
			<input type="checkbox"/> YES    NO <input type="checkbox"/>
			<input type="checkbox"/> YES    NO <input type="checkbox"/>

**CLAIM FOR BENEFIT OF PRIOR U.S. PROVISIONAL APPLICATION(S)**  
(34 U.S.C. § 119(e))

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below:

**PROVISIONAL APPLICATION NUMBER**

**FILING DATE**

60 / 152,399  
\_\_\_\_ / \_\_\_\_\_  
\_\_\_\_ / \_\_\_\_\_

September 3, 1999  
\_\_\_\_\_  
\_\_\_\_\_

**CLAIM FOR BENEFIT OF EARLIER US/PCT APPLICATION(S)**  
**UNDER 35 U.S.C. § 120**

- ☐ The claim for the benefit of any such applications are set forth in the attached ADDED PAGES TO COMBINED DECLARATION AND POWER OF ATTORNEY FOR DIVISIONAL, CONTINUATION OR CONTINUATION-IN-PART (C-I-P) APPLICATION.

**ALL FOREIGN APPLICATION(S), IF ANY, FILED MORE THAN 12 MONTHS  
(6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION**

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**NOTE:** If the application filed more than 12 months from the filing date of this application is a PCT filing forming the basis for this application entering the United States as (1) the national stage, or (2) a continuation, divisional, or continuation-in-part, then also complete **ADDED PAGES TO COMBINED DECLARATION AND POWER OF ATTORNEY FOR DIVISIONAL, CONTINUATION OR C-I-P APPLICATION** for benefit of the prior U.S. or PCT application(s) under 35 U.S.C. § 120.

**POWER OF ATTORNEY**

I hereby appoint the following practitioner(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

*(list name and registration number)*

**DEBORAH A. PEACOCK, Reg. NO. 31,649**

*(check the following item, if applicable)*

- ☒ I hereby appoint the practitioner(s) associated with the Customer Number provided below to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.
- ☐ Attached, as part of this declaration and power of attorney, is the authorization of the above-named practitioner(s) to accept and follow instructions from my representative(s).

**NOTE:** "Special care should be taken in continuation or divisional applications to ensure that any change of correspondence address in a prior application is reflected in the continuation or divisional application. For example, where a copy of the oath or declaration from the prior application is submitted for a continuation or divisional application filed under 37 CFR 1.53(b) and the copy of the oath or declaration from the prior application designates an old correspondence address, the Office may not recognize, in the continuation or divisional application, the change of correspondence address made during the prosecution of the prior application. Applicant is required to identify the change of correspondence address in the continuation or divisional application to ensure that communications from the Office are mailed to the current correspondence address. 37 CFR 1.63(d)(4)." § 601.03, M.P.E.P., 7th Edition.

SEND CORRESPONDENCE TO

☐ Address

DIRECT TELEPHONE CALLS TO:  
*(Name and telephone number)*

**Deborah A. Peacock (505) 998-1500  
Direct line (505) 998-1501**

☒ Customer Number 005179

*(complete the following if applicable)*

Since this filing is a ☐ continuation ☐ divisional there is attached hereto a Change of Correspondence Address so that there will be no question as to where the PTO should direct all correspondence.

005179 2385960

## DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

## SIGNATURE(S)

NOTE: Carefully indicate the family (or last) name, as it should appear on the filing receipt and all other documents.

NOTE: Each inventor must be identified by full name, including the family name, and at least one given name without abbreviation together with any other given name or initial, and by his/her residence, post office address and country of citizenship. 37 CFR § 1.63(a)(3).

NOTE: Inventors may execute separate declarations/oaths provided each declaration/oath sets forth all the inventors. Section 1.63(a)(3) requires that a declaration/oath, inter alia, identify each inventor and prohibits the execution of separate declarations/oaths which each sets forth only the name of the executing inventor. 62 Fed. Reg. 53,131, 53,142, October 10, 1997,

Full name of sole or first inventor

WAYNE

(GIVEN NAME)

HARLAN

(MIDDLE INITIAL OR NAME)

FAMILY (OR LAST NAME)

Inventor's signature \_\_\_\_\_

Date \_\_\_\_\_ Country of Citizenship U.S.

Residence Albuquerque, New Mexico

Post Office Address 6934 Fourth Street, N.W.  
Albuquerque, New Mexico 87107

Full name of second joint inventor, if any

(GIVEN NAME)

(MIDDLE INITIAL OR NAME)

FAMILY (OR LAST NAME)

Inventor's signature \_\_\_\_\_

Date \_\_\_\_\_ Country of Citizenship \_\_\_\_\_

Residence \_\_\_\_\_

Post Office Address \_\_\_\_\_

Full name of third joint inventor, if any

(GIVEN NAME)

(MIDDLE INITIAL OR NAME)

FAMILY (OR LAST NAME)

Inventor's signature \_\_\_\_\_

Date \_\_\_\_\_ Country of Citizenship \_\_\_\_\_

Residence \_\_\_\_\_

Post Office Address \_\_\_\_\_

(check proper box(es) for any of the following added page(s)  
that form a part of this declaration)

- ☐ **Signature** for fourth and subsequent joint inventors. Number of pages added \_\_\_\_\_

\* \* \*

- ☐ **Signature** by administrator(trix), executor(trix) or legal representative for deceased or incapacitated inventor. Number of pages added \_\_\_\_\_

\* \* \*

- ☐ **Signature** for inventor who refuses to sign or cannot be reached by person authorized under 37 CFR 1.47. Number of pages added \_\_\_\_\_

\* \* \*

- ☐ Added page for **signature** by one joint inventor on behalf of deceased inventor(s) where legal representative cannot be appointed in time. (37 CFR 1.47)

\* \* \*

- ☐ Added pages to combined declaration and power of attorney for divisional, continuation, or continuation-in-part (C-I-P) application.

☐ Number of pages added \_\_\_\_\_

\* \* \*

- ☐ Authorization of practitioner(s) to accept and follow instructions from representative.

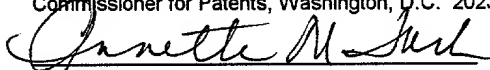
\* \* \*

(if no further pages form a part of this Declaration,  
then end this Declaration with this page and check the following item)

- ☒ This declaration ends with this page.

PATENT APPLICATION

I hereby certify that this paper is being deposited with the United States Postal Service  
"Express Mail Post Office to Addressee" service under 37 CFR 1.10 via Label  
No. EL548785156US on September 1, 2000, addressed to Box: PATENT APPLICATIONS,  
Commissioner for Patents, Washington, D.C. 20231.

  
Annette M. Turk, Legal Assistant

September 1, 2000  
Date Signed

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s):	WAYNE HARLAN	:
		:
Serial No.:	UNKNOWN	: Attorney Docket No.: 30882UT1001
		:
Filed:	HEREWITH (September 1, 2000)	: Anticipated Group Art Unit: UNKNOWN
		:
For:	POLYMER-MODIFIED ASPHALT EMULSION	:
		:

ASSOCIATE POWER OF ATTORNEY

**Box: Patent Application**  
Commissioner for Patents  
Washington, D.C. 20231

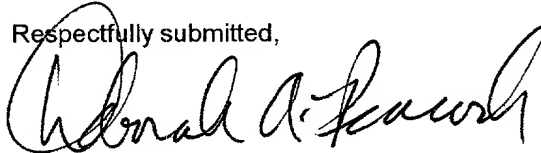
Dear Sir:

Deborah A. Peacock, a principal attorney in the above-identified application for Letters Patent, hereby  
appoints:

Jeffrey D. Myers, Reg. No. 35,964  
Paul Adams, Reg. No. 21,096  
Rod D. Baker, Reg. No. 35,434  
Brian J. Pangrle, Reg. No. 42,973  
Andrea L. Mays, Reg. No. 43,721; and  
Stephen A. Slusher, Reg. No. 43,924

as associate attorneys with full power.

Respectfully submitted,



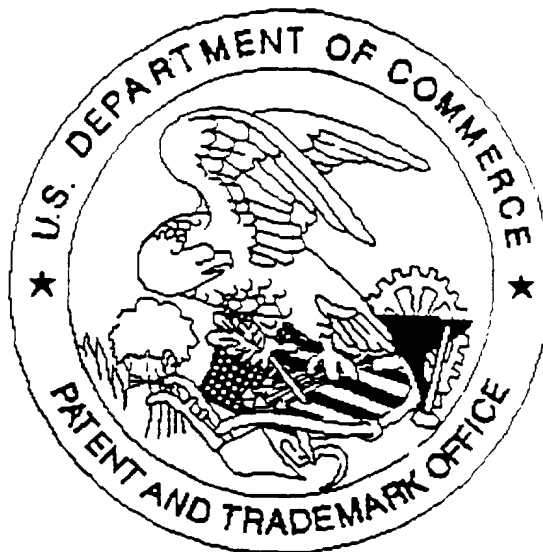
Date: September 1, 2000

Deborah A. Peacock, Reg. No. 31,649  
Direct line: (505) 998-1501

Attorney for Applicant(s)  
PEACOCK, MYERS & ADAMS, P.C.  
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**Customer No. 005179**

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Application deficiencies were found during scanning:

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for scanning. (Document title)

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for scanning. (Document title)

There are only 8 pages of declaration  
and power of attorney.

☐ Scanned copy is best available.